CLAIMS

1. Method for twin-sheet thermoforming plastic fuel tanks, according to which first and second sheets (SA, SB) of thermoformable plastic material are independently heated and moved along a first (A) and, respectively, along a second (B) processing line from a loading station (11A, 11B) to a respective thermoforming station (16A, 16B), the method comprising the main steps of:

- subjecting each plastic sheet (SA, SB) to a heating;

- pneumatically clamping the heated plastic sheet (SA, SB) along its peripheral edge, and vacuum supporting the same sheet (SA, SB) in a substantially flat condition while it is moved along the respective processing line (A, B);

- positioning each heated plastic sheet (SA, SB) above a respective shaping mold (17A, 17B) having a facing-up shaping cavity, while continuing to pneumatically hold the sheet (SA, SB) in the aforesaid substantially flat condition;

- lowering the heated plastic sheet (SA, SB) into a respective mold (17A, 17B); and

- thermoforming each heated plastic sheet (SA, SB) into a respective shell (GA, GB), making the same sheet (SA, SB) to adhere to the upwardly open cavity of the shaping mold (17A, 17B);

the method also comprising the supplementary steps of:

- up-side down turning one (17B) of the shaping molds (17A, 17B) and the thermoformed shell (GB);

- superimposing said up-side down turned mold (17B) to the other one (17A) facing up mold (17A), to overlap peripheral sealing areas of the two superimposed thermoformed shells (GA, GB); and

- fusing and hermetically welding the overlapped sealing areas of the shells (GA, GB) by pressing said overlapped sealing areas between clamping surfaces of the shaping molds (17A, 17B).

2. Method for twin-sheet thermoforming of fuel tanks according to claim 1, comprising the steps of preheating (12A, 12B) each plastic sheet (SA, SB) to a first heating temperature lower than a thermoforming temperature, and

maintaining the heating of the sheet (SA, SB) while it is moving along the processing line (A, B).

3. Method for twin-sheet thermoforming of fuel tanks according to claims 1 and 2, comprising the steps of controlling the vacuum degree for supporting the sheet (SA, SB), to prevent sagging during the heating and movement along the processing line (A, B).

4. Method for twin-sheet thermoforming of fuel tanks according to claim 1, comprising the steps of introducing inserts and/or components for the fuel tank, into the upwardly facing cavity of the molds, before thermoforming of the plastic sheets (SA, SB).

5. Method for twin-sheet thermoforming of fuel tanks according to claim 1, comprising the steps of introducing inserts and/or components of the fuel tank, into the thermoformed shells (GA, GB) through the upwardly facing cavity of the molds (17A, 17B).

6. Method for twin-sheet thermoforming of fuel tanks according to claim 1, comprising the steps of removing the closed molds (17A, 17B), and of carrying out a cooling of the same closed molds (17A, 17B) outside of the processing lines.

7. Plant for manufacturing plastic fuel tanks comprising first and second twin-sheet thermoformed shells (GA, GB), according to which first and second thermoformable plastic sheets (SA, SB) are independently heated and moved along respective first and second processing lines (A, B), from a loading station (11A, 11B) through at least one heating station (12A, 14A; 12B, 14B), towards a respective thermoforming station (16A, 16B) where the individual plastic sheets (SA, SB) are thermoformed in a first and a second shell (GA, GB) into a respective first and second shaping mold (17A, 17B), wherein:

- said first and second shaping molds (17A, 17B) are side by side arranged with the open cavities of both molds (17A, 17B) facing upwards;

wherein each processing line (A, B) comprises pneumatically actuable gripping means (24A, 24B) for gripping the plastic sheets (SA, SB) around their peripheral edges, and a vacuum sheet holding device (15A, 15B) for the heated plastic sheets (SA, SB), said pneumatic gripping means (24A, 24B) and said

vacuum holding device (15A, 15B) being movable along the processing lines (A, B); and vacuum control means for the vacuum holding device (24A, 24B) for supporting the heated plastic sheets (SA, SB) in a substantially flat condition; and

drive means (33) conformed and arranges to turn one mold (17A, 17B) upside down to superimpose to the other one (17A, 17B) and to cause welding of overlapped sealing areas of the thermoformed shells (GA, GB), by compression of the same molds (17A, 17B).

8. Plant for manufacturing plastic fuel tanks according to claim 7, comprising a sheet preheating station (12A, 12B).

9. Plant for manufacturing plastic fuel tanks according to claim 7, comprising a sheet centering station (13A, 13B).

10. Plant for manufacturing plastic fuel tanks according to claims 8 and 9, wherein the sheet centering station (13A, 13B) is provided upstream of the sheet preheating station (12A, 12B).

11. Plant for manufacturing plastic fuel tanks according to claims 8 and 9, wherein the centering station (13A, 13B) is provided between the preheating station (12A, 12B) and a second heating station (14A, 14B) for the plastic sheets (SA, SB).

12. Plant for manufacturing plastic fuel tanks according to claim 7, wherein the vacuum supporting device (15A, 15B) comprises heating elements (28) for the plastic sheets (SA, SB).

13. Plant for manufacturing plastic fuel tanks according to claim 7, wherein said vacuum supporting device (15A, 15B) is connected to a adjustable vacuum source.

14. Plant for manufacturing plastic fuel tanks according to claim 7, wherein each mold (17A, 17B) comprises second pneumatically actuable sheet gripping means (36A, 36B).

15. Plant for manufacturing plastic fuel tanks according to claim 7, wherein said vacuum holding device (15A, 15B) is in the form of a pneumatically actuable suction bell.

16. Plant for manufacturing plastic fuel tanks according to claim 7,

comprising a mold cooling station (20) on one side of the processing lines (A, B), in a side aligned condition with a thermoforming station (16A, 16B), for transferring the closed molds (17A, 17B) between the thermoforming station (16A, 16B) and the cooling station (20) of the plant.

17. Plant for manufacturing plastic fuel tanks according to claim 16, wherein the cooling station (20) comprises a rotary table (50) having a plurality of mold supporting surfaces (51, 52).

18. Plant for manufacturing plastic fuel tanks according to claim 16, wherein the cooling station (20) comprises a reciprocable mold supporting shuttle (54) parallely arranged to the processing lines (A, B), said shuttle (54) being provided with at least a first and a second mold supporting surfaces (55, 56).

19. Plant for manufacturing plastic fuel tanks according to claim 16, wherein said means for transferring the molds (17A, 17B) comprise a mold clamping cage (40, 41) reciprocable between a thermoforming station (16A, 16B) and the cooling station (20).

20. Plant for manufacturing plastic fuel tanks according to claim 7, wherein said drive means for upside down turning one mold (17B), comprises a book press.

21. Plant for manufacturing fuel tanks according to claim 14, wherein each mold (17A, 17B) comprises additional mechanical means (48) for gripping the edges of the heated plastic sheets (SA, SB).